MAGPIE REDUCTION IN AN URBAN ROOST

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ABSTRACT

From 80 to 85 percent of about 250 black-billed magpies (Pica pica hudsonia) in an urban roost were killed with poultry pellets treated with 2 percent 4-aminopyridine, a chemical frightening agent. Before death, birds exhibited typical distress reactions, but other magpies were attracted rather than repelled, as expected, by this behavior. Bait was exposed in metal troughs for 1½ hours on 4 successive evenings. Four months later a second population of about 280 birds using the same roost was reduced 75 percent with pellets treated with 1 percent DRC-1339 (3-chloro-p-toluidine hydrochloride), a lethal agent. Bait was required only 1 evening, for 1½ hours. One year later the population contained only 85 birds. Both chemicals were effective in reducing magpie numbers, but from the standpoint of hazards to mammals and number of treatments needed, DRC-1339 appears more suitable.

MAGPIE REDUCTION IN AN URBAN ROOST

During early October 1964, approximately 250 black-billed magpies (Pica pica hudsonia) congregated at a cemetery in Denver, Colo., where they roosted at night in scattered conifers. The cemetery covers approximately 480 acres, 320 of which support ornamental and shade trees, and numerous flowering shrubs. The trees served as roosting sites for birds through late summer, fall, and winter. Starlings (Sturnus vulgaris), robins (Turdus migratorius), house sparrows (Passer domesticus), house finches (Carpodacus mexicanus), and magpies were most common, in descending order of abundance; but as winter progressed there was a decline in numbers of starlings and robins and an increase in house finches and magpies. By February 1965, magpies were roosting mostly in two rows of evergreens lining the main driveway.

The magpies were a problem at the cemetery because they defaced headstones with droppings and pulled apart newly potted flowers. Baiting trials were conducted to evaluate the relative control efficacy of two chemicals: a frightening agent, 4-aminopyridine, and a slow-acting, nonviolent toxic compound, 3-chloro-p-toluidine hydrochloride, coded at the Denver Wildlife Research Center as DRC-1339.

Several investigators have recently shown in both laboratory and field tests that these two compounds are useful for controlling potential damage by other species of birds. After testing more than 400 chemicals in a search for a starling toxicant and finding that only one met requirements, DeCino et al. (1966:253) concluded that "DRC-1339 can be safely used in starling control, with effectiveness far exceeding previously used toxicants." Besser et al. (1967) have shown that DRC-1339-treated poultry pellets were effective lethal baits for starlings in a trial conducted at a cattle feedlot in Nevada, and Richard R. West (unpublished) successfully used DRC-1339-treated pellets to reduce a problem starling population in Colorado. Goodhue and Baumgartner (1965:833) field tested 4-aminopyridine (trade-named Avitrol 200 by the Phillips Petroleum Company)[1] on house sparrows, pigeons (Columba livia), cowbirds (Molothrus ater), and red-winged blackbirds (Agelaius phoeniceus) with varying degrees of success. They also mentioned the feasibility of this compound for controlling gulls and other birds at airports. John W. De Grazio (unpublished) successfully used 4-aminopyridine baits to reduce damage to field corn by red-winged blackbirds in South Dakota.

1 Trade names referred to in this publication do not imply Government endorsement of commercial products.

METHODS AND MATERIALS

In the first trial, 5 pounds of screened Layena poultry pellets were treated with 2 percent by weight of 4-aminopyridine, giving about 1.4 mg of chemical per pellet. These pellets were mixed with untreated pellets at a 1:9 ratio. The bait was exposed in 12 galvanized troughs (12- x 24- x 4-inches deep) placed on the ground in the cemetery in scattered areas of high magpie activity. The troughs were in place for approximately 1½ hours before dark each evening, October 12 to 15, and were kept under continuous observation.

By February 1965, 4 months after the first trial, the magpie population had again increased to about 280 birds. We could not determine whether part of this population constituted birds that survived the first treatment. Probably, winter temperatures and snows had driven magpies from other areas to seek shelter in the coniferous trees lining the roads. A second baiting trial was conducted, but this time we used DRC-1339. Forty pounds of pellets treated with 1 percent DRC-1339 were exposed in eight troughs for 1½ hours before dark each evening, February 16, 17, and 18, 1965. Each pellet contained about 0.7 mg of DRC-1339. The troughs were placed near roost trees, at the same sites all 3 nights, and again watched continuously.

During each trial, estimates of pretreatment and posttreatment magpie populations were made during morning and late afternoon by driving down all cemetery lanes and tallying birds in trees and on the ground. Flying birds were counted only if they moved into a previously censused area. Dead and affected birds were collected each morning and for several days after baiting. Morning and afternoon populations are considered distinct entities because we believe that there was both a resident population that roosted and remained in the cemetery most of the day, and another population that foraged out several miles during the day and returned to the cemetery only to roost.

RESULTS AND DISCUSSION

In the 4-aminopyridine trial, magpies showed aversion to the bait sites after 2 days, so on the third and fourth days the troughs were moved to new locations where the bait was again accepted. One magpie was observed taking 26 pellets from a trough, and several others took from 11 to 13. Most birds fed for only a few seconds, then hopped off the troughs or flew to nearby trees and returned for a second or third feeding. Symptoms appeared in an average of 37 minutes.

The distress actions of afflicted magpies did not repel other magpies. Instead, the calls and actions of ailing birds, either on the ground or fluttering in the air, often attracted other magpies, which mobbed and killed the affected birds. Although the results were not as expected, the magpie population was reduced by 82 percent within 1 week, largely owing to the lethal properties of the compound. Not more than 54 magpies were observed in the roost within the next 2 months, and more than 90 percent of this reduction was verified by counts of dead birds (table 1).

TABLE 1. Estimated populations and numbers of dead magpies found on various dates following baiting with 4-aminopyridine-treated poultry pellets, 1964.

Date	Population estimates		Dead magpies recorded
	Morning	Late afternoon	
Oct. 8-9	-	250	0
12*	100	250	0
13*	32	100	63
14*	31	45	26
15*	18	-	44
16	18	-	19
19-Dec. 18	-	54**	40
Total			192

*Bait exposed.
**Highest of five counts made during this period.

In the second trial, using DRC-1339, the estimated population reduction varied with the method of evaluation; based on collections of dead birds it was 53 percent, and on morning and afternoon counts, 75 percent (table 2). This difference is probably due to the slow action of DRC-1339, which allowed some affected birds to leave the roost area before dying. We feel that the true reduction is more accurately expressed by the live bird surveys than by the dead bird counts.

Most of the population reduction with DRC-1339 was achieved the first evening of baiting since only nine magpies were counted at the troughs the second and third nights. Affected birds died within 12 to 72 hours; many became entangled in nearby coniferous trees where they were not easily seen when we made the daily census. For example, 52 dead birds were found in a thorough search 3 weeks after the baits were exposed. About 95 percent of the dead birds were located under or in the two rows of conifers used as roost trees. In contrast, magpies killed with 4-aminopyridine died within an hour near the bait troughs and were easily found.

TABLE 2. Estimated populations and numbers of dead magpies found on various dates following baiting with DRC-1339-treated poultry pellets, 1965.

Date	Population estimates		Dead magpies recorded
	Morning	Late afternoon	
Feb. 3	169	278	0
15	198	280	0
16*	-	-	0
17*	53	142	54
18*	40	58	18
19	-	-	23
23	59	67	-
March 8	-	-	52
Total			147

*Bait exposed.

In February 1966, only 85 magpies roosted in the cemetery, the fewest in several years according to the cemetery manager, and 82 percent fewer than the probable total of 470 magpies that we believe would have used the roost in February 1965 had none been poisoned (about 280 magpies were counted at this roost on February 3 and February 15, 1965 after 192 were killed earlier). As black-billed magpies are permanent residents of Colorado (Niedrach and Rockwell 1959:116) and many do not migrate, though they are given to erratic wanderings (Bent 1951:152), we believe that the 1966 roosting population was composed of many of the same individuals as in 1965 and that the baitings reduced the population enough so that it could not recover to prebaiting numbers in 1 year.

CONCLUSIONS

Excellent results in controlling the roosting magpie populations were obtained with poultry pellets treated with either 4-aminopyridine or DRC-1339. The results with both compounds were due to lethal rather than to fright-producing effects. The birds readily accepted treated pellets from metal troughs without prebaiting, but site aversion occurred near troughs when magpies became affected with 4-aminopyridine. No such aversion resulted from DRC-1339 because of its slower action; most birds were killed the first evening.

Species other than magpies were not affected during either trial, probably because of two factors: the pellets used as bait are selective for only a few species of birds, and magpies quickly claimed ownership of the bait troughs and prevented other birds from feeding.

Goodhue and Baumgartner (1965: 837) state that there is a complete absence of secondary poisoning in treatments with 4-aminopyridine, and DeCino et al. (1966:249) show that there are minimal secondary hazards associated with the use of DRC-1339 to avian or mammalian predators. Both compounds are highly toxic to birds, but the oral toxicity range or level of safety between birds and mammals (rats) is greater for DRC-1339 (rat LD_{50}> 1,000 mg/kg) (DeCino et al. 1966: 250) than for 4-aminopyridine (rat LD_{50} = 32 mg/kg) (Goodhue and Baumgartner 1965:831). This safety factor for mammals and the results of this one trial suggest that DRC-1339 is more suitable than 4-aminopyridine in reducing magpie populations concentrated at roosts.

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